Q-7. (a) How does the corroding environment affect the rate of corrosion? (6)

(b) What is the mechanism of dry corrosion? (6)

(c) Write & explain different methods of cathodic protection of metal from corrosion. (8)

Q-8. (a) Write down different types of structures involved in proteins. (10)

(b) Write reaction for N-terminal analysis or C-terminal analysis of protein. (4)

(c) What are reducing & non reducing sugars, explain with example. Write structural formula of one reducing sugar and one non reducing sugar. (6)

Roll No. ……..

Lingaya's University, Faridabad
B.Tech, 1st Year (Term – I)
Examination – October, 2010
Applied Chemistry (CH-101)

Time: 3 Hours **Max. Marks: 100**

Before answering the question, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard will be entertained after the examination.

Note: *All questions carry equal marks. Attempt five questions. Question 1 is compulsory. Select two questions from Section B & two from Section C.*

SECTION – A

Q-1. ***Part-A***

Select the correct answer of the following multiple choice questions. (1x10=10)

(i) The intermetallic compound formed in a Zn-Mg system is

(a) MgZn (b) Mg_2Zn (c) $MgZn_2$ (d) Mg_2Zn_2

(ii) In high pressure boiler, scale are mainly formed by

(a) $Ca(HCO_3)_2$ (b) $CaSO_4$
(c) $CaSO_4$ & silica (d) $MgCl_2$ & $Ca(HCO_3)_2$

(iii) Permutit exchange Ca^{2+} & Mg^{2+} ions present in water with

(a) H^+ ions (b) Na^+ ions (c) Zeolite ions (d) none of these

(iv) Corrosion is an example of

(a) oxidation (b) reduction (c) electrolysis (d) erosion

(v) In water system the three phases exist in equilibrium at

(a) 0^oC, 1 atm (b) 0^oC, 4.58 mm
(c) 0.0075^oC, 4.58 mm (d) 0.0075^oC, 1 atm

(vi) Formula of sodium hexameta phosphate i.e. calgon is

(a) $Na_2 (PO_3)_6$ (b) $Na_4 (PO_3)_6$
(c) $Na_6 (PO_3)_6$ (d) $(NaPO)_6$

(vii) The lifetime of phosphorescence is

(a) 10^{-9} to 10^{-6}s (b) 10^{-6} to 10^{-3} s
(c) 10^{-3} to 10s (d) 10 to 10^3 sec

(viii) Which of the following relation is correct

(a) dP = VdG – SdT (b) dT = VdP –SdG
(c) dG = VdP – SdT (d) none of the above

(ix) Which one is not a state function

(a) Entropy (b) Work (c) Internal Energy (d) Enthalpy

(x) The shorter chain mineral oil possess

(a) low viscosity (b) no viscosity
(c) high viscosity (d) moderate viscosity

Part – B

(a) Derive Gibb's Helmholtz equation and mention its significance. (5)

(b) 100 ml of water sample on titration with H_2SO_4 require 12.4 ml of the acid to phenolphthalein end point and another 100 ml of water sample required 15.2 ml of the acid to methyl orange end point. Determine the type & extent of alkalinity present in water sample. (5)

Section – B

Q-2. (a) Draw & explain phase diagram of compound having congruent melting point. (12)

(b) Derive Gibbs Phase rule equation. (8)

Q-3. (a) Describe demineralization of water by ion exchange process used for softening method. What are the advantages & limitations of the process? (12)

(b) Explain the following with chemical reactions.

(i) Dechlorination (ii) Calgon conditioning
(iii) Phosphate conditioning (iv) Caustic embrittlement (8)

Q-4. (a) What are synthetic lubricants? Write an explanatory note on it. (8)

(b) Define consistency. How it can be measured experimentally? (6)

(c) Explain the following:

(i) Cloud & pour point (ii) Iodine value (iii) Drop point (6)

Q-5. (a) Explain the following: (9)

(i) Grotthus Draper Law (ii) Stark Einstein Law

(iii) Lambert Beer Law

(b) Explain chemiluminescence and fluorescence with example. (5)

(c) Define quantum yield. What are reasons for low quantum yield? (6)

Section – C

Q-6. (a) Define chemical potential. Derive Gibb's Duhem equation. (8)

(b) Derive the following relation.

(i) $-\Delta A = W_{rev}$ (ii) $-\Delta G = w - P\Delta V$ (6)

(c) Calculate the value of dT|dP for water $\Leftrightarrow$ ice system at 0^oC. ΔH_f for water is 6007.8 J mol^{-1}

(1 J = 9.87 x 10^{-3} dm^3 atm); molar volume of water = 18.00 cm^3; of ice 19.63 cm^3 (6)